

REMARKS

Claims 1-6, all the claims pending in the application, stand rejected. Claim 1 has been amended. New claims 7-11 have been added. Support for the recited features is provided in the following argument.

Claim Rejections – 35 USC §103

Claims 1-6 are rejected under 35 USC §103 as being unpatentable over Yabe et al (5,834,142) in view of Hashimoto et al (5,721,075). This rejection is traversed for at least the following reasons.

The present invention is focused on alleviating internal stress of a light absorption film by selectively heating a light absorption film by a laser beam. A goal is to heat the film without heating a transparent substrate, which may be formed, for example, by synthesized quartz (namely, SiO₂; see page 15, lines 5 to 1 from the bottom, of the specification). According to the present invention, the transparent substrate does not absorb the laser beam and is therefore scarcely heated by the laser beam.

The present invention is very effective to heat the light absorption film for an extremely short time of, for example, several tens of nanoseconds and to heat the film to a highest heating temperature of, for example, 1000°C or more (explicitly described in page 5, lines 15 to page 7, line 2 of the specification). The present invention is particularly advantageous when the light absorption film is formed by a light translucent film, such as a film of MoSiN (see page 13, lines 5 to 3 from the bottom) used for a phase shift mask blank of a half tone type. This is because such a film comprising MoSiN has a property such that internal stress is near to zero as the heating temperature becomes high.

By contrast, Yabe et al (5834142) disclose a method of manufacturing an X-ray mask, as pointed out by the Examiner. Specifically, such an X-ray mask comprises a silicon substrate 1, a membrane 2, which may be called an X-ray permeable substrate (column 1, lines 19 to 20), and an X-ray absorber 4. In Fig. 15, the X-ray absorber 4 is heated by the laser output while moving the laser beam 30 on the X-ray absorber 4 and adjusting the strength of the laser beam 30 so that the X-ray absorber 4 is heated to correspond to the specified temperature distribution (column 12, lines 33 to 37).

Notably, the X-ray mask has a silicon (Si) substrate (that is different from SiO₂ or glass substrate), as mentioned above. Further, the silicon substrate absorbs the laser beam. Therefore, one skilled in the art would clearly understand that the method according to Yabe et al heats not only the X-ray absorber but also the silicon substrate by the laser output. There is no teaching in Yabe et al that only the X-ray absorber is selectively heated.

Accordingly, Applicants respectfully submit that the method disclosed in Yabe et al can not increase the output power of the laser because the silicon substrate is always heated and might be undesirably damaged by such high power laser output. In other words, Yabe et al does not disclose irradiating the X-ray absorber by a high power laser. The reference has no pertinent teaching with respect to the essence of the present invention.

Hashimoto et al. does not remedy the deficiencies of Yabe. Hashimoto et al teaches a method of fabricating a halftone phase shift photomask blank, as pointed out by the Examiner. However, Hashimoto et al. does not provide any teaching or suggestion with regard to selectively heating a light absorption film alone by a high power laser.

AMENDMENT UNDER 37 C.F.R. § 1.111
USSN: 09/998,422

Taking the above into account, Applicant respectfully submits that the present invention is not obvious from Yabe et al. and Hashimoto et al.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

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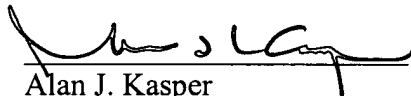
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